DOCUMENT RESUME

ED 282 254 CS 210 567

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TITLE Effects of Cuing of Familiar and Unfamiliar Acronyms and Need for Cognition on Recognition: An Experiment to Suggest Newspaper Style Guidelines.
PUB DATE Aug 87
NOTE 27p.; Paper presented at the Annual Meeting of the Association for Education in Journalism and Mass Communication (70th, San Antonio, TX, August 1-4, 1987).
PUB TYPE Speeches/Conference Papers (150) -- Reports - Research/Technical (143)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Abbreviations; *Context Clues; Higher Education; Journalism; Media Research; *Newspapers; News Writing; *Prior Learning; *Reader Response; *Reading Comprehension; Reading Processes; Word Recognition

ABSTRACT

A study explored the effects of both prior knowledge of acronyms and their form of presentation (cued or uncued) on reader recognition of acronym meaning. Among the hypotheses tested were that (1) a reader presented with an acronym ranked as familiar is more likely to recognize that acronym than one ranked unfamiliar, and (2) that a reader presented with an acronym that is cued (i.e., the acronym appears in parentheses after the use of the words it represents) is more likely to recognize that word on subsequent presentations than a reader of an uncued acronym. Subjects were 125 undergraduates enrolled in a writing for the mass media class at the University of Florida. They were given five news stories of approximately 250 words each--one being a control story. Each of the four experimental stories was identical except for the acronyms used and the way the acronyms were presented. Two dimensions of recognition were measured--recall and meaning assignment--using a 24-item scale. Results indicated that for acronyms at the extreme ends of the familiarity spectrum, cuing readers to the meaning is not an important factor in whether they will recognize those acronyms. In addition, of readers who said they had difficulty with the presented stories, those who were presented with unfamiliar acronyms--whether cued or uncued--had significantly lower recognition scores than those who were presented with familiar acronyms. Results suggest that unless an acronym was already in a reader's lexicon, the reader had difficulty recognizing it. (A table of results and the five stories are appended. Fourteen references are included.) (AEW)

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EFFECTS OF CUING OF FAMILIAR AND UNFAMILIAR ACRONYMS AND NEED FOR COGNITION ON RECOGNITION: AN EXPERIMENT TO SUGGEST NEWSPAPER STYLE GUIDELINES

By

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EFFECTS OF CUING OF FAMILIAR AND UNFAMILIAR ACRONYMS AND NEED FOR COGNITION ON RECOGNITION: AN EXPERIMENT TO SUGGEST NEWSPAPER STYLE GUIDELINES

INTRODUCTION

Acronyms are frequently used in the printed mass media, sometimes cued in parentheses following the words for which they stand but more often standing alone. This difference in format occurs not only between publications but also within specific publications, despite efforts by editors to establish rules for acronym use.

An acronym is an abbreviation usually formed of the first letters of words for which it stands. Some acronyms--for instance, CIA and FBI--have become so familiar that their use separate from the words represented by these letters is common place in the print media. Other acronyms appear but with less frequency.

Whether to use acronyms and in what form are decisions usually made by editors of publications, who often incorporate their decisions as part of the publication's style manual or style book. Although the final decisions are independently made, these decisions for daily newspapers often conform to the style strictures of the major wire services, since much of the news copy in daily newspapers is supplied by these services and each paper can most easily present readers with a uniformly written produce by conforming locally written copy to wire service style.

The Associated Press Stylebook and Libel Manual (1984) is the most recently revised edition of that wire service's style

manual. For using acronyms, the manual presents the following ambiguous advice:

> Some organizations and government agencies are widely recognized by their initials: CIA, FBI, GOP.
>
> If the entry (in the manual) for such an organization notes that an abbreviation is acceptable in all references or on second reference, that does not mean that its use should be automatic. Let the context determine, for example, whether to use Federal Bureau of Investigation or FBI. (Associated Press, 1984, p.4)

The largest circulation daily newspaper in Florida, The Miami Herald, uses different words to express the same posture on acronyms as the Associated Press (Miami Herald, p. 2A).

Another alternative, that of introducing the acronym by placing it in parentheses after the first use of the words for which it stands, was Associated Press style but is now specifically prohibited in the Associated Press manual (Associated Press, 1984, p.4). This alternative is the preferred use at some newspapers like the St. Petersburg Times in Florida (Stiff, 1978). Implicit in the choice of this alternative is a belief that placing the acronym in parentheses next to its meaning will cue readers to that meaning and help them recognize the acronym later in the story when the acronym appears undefined.

Uncued use of an acronym on second reference assumes that readers know its meaning and do not need whatever help is provided by cuing. This research explores the effects of both prior knowledge of acronyms and their form of presentation (cued or uncued) on reader recognition of acronym meaning. Also, the

effect of a reader's tendency to engage in and enjoy effortful cognitive activity on acronym recognition is considered.

THEORIES AND HYPOTHESES

Reading is a largely cognitive activity (Carmichael and Dearborn, 1947) preceded by the perceptual process of visually processing the written stimuli (Glass & Holyoak, 1986). Chumbley and Balota say that the dominant theories of word recognition, which is the beginning of the cognitive processes:

> . . . assume that the process of accessing the lexical entry for a word involves matching the visual characteristics of the stimulus with an internal representation of the stimulus word. When the visual characteristics and the internal representation have sufficient overlap, the appropriate lexical entry has been located; lexical access has been accomplished. At this point, and only at this point, the meaning, pronunciation, and other information associated with the word becomes available. (1985, p. 590)

A large vocabulary betters the chance that the individual will recognize little-used words but the final determinant will be whether the specific word is in the individual's lexicon or "mental thesaurus" (McKoon and Ratcliff, 1979, p. 463). Bouwhuis says:

> A word which is not part of the reader's word knowledge is not a word for that reader, while it may be perfectly acceptable to those who know it. It is not difficult to find such words and this observation merely stresses the fact that words are so numerous that they cannot all be known by any one individual. Words in a language range from common words of the vernacular to specialized jargon. (1979, p. 270)

Thus, a reader presented with an acronym either is totally

unfamiliar with the acronym or possesses a degree of familiarity with it. Hypothesis 1 states that a reader presented with a familiar acronym will be more likely to recognize that acronym than will a reader presented with an unfamiliar acronym. The Associated Press manual asserts that only acronyms with which readers are familiar are to be used and it contains more than four dozen that the manual's producers believe fall in that "familiar" category. Unstated is how the manual's author or daily newspaper editors who follow the manual are certain that readers are familiar with these acronyms.

This assumption of readers' knowledge of acronyms is not made by the writers and editors of all daily newspapers. As mentioned, the editors of the St. Petersburg Times insert the acronym within parentheses immediately after the first use of its meaning. One purpose of this research is to learn if such cuing is helpful to readers in identifying known or unknown acronyms. Similar constructs have been used in cognitive research in lexical memory to test a subject's ability to distinguish words from non-words. During these experiments, it is commonly found that subjects are quicker to respond that a target is a word when the prime, or cue word, was a semantically related word than when the prime was semantically unrelated. From this, researchers hypothesize that schematic representations of semantically related words are, using a spatial metaphor, located nearer each other in the lexicon than are semantically unrelated representations. This nearness accounts for the activation of

the prime leading to the quick following activation of the target word, either through spreading excitation from the initial activation or because the spatial proximity of the two schematic representations facilitates a shift in a limited-capacity attentional mechanism (Neely, 1976.)

This study assumed that the acronym and the words which the acronym abbreviate should function the same as target and prime words, respectively. Thus, hypothesis 2 states that a reader presented with an acronym that is cued will be more likely to recognize that word on subsequent presentations than will a reader of an uncued acronym.

While it would seem impossible to recognize an acronym upon seeing it for the first time, this first reading should be the beginning of acquiring a lexical entry, including meaning, for that acronym. If the unfamiliar acronym was presented uncued, the reader would gain some sense, however vague, of the acronym's meaning from the context in which it is used. If presented cued, this acronym presents the reader not only with contextual information but also with an explicit definition. It may be that this cuing effect is enough to overcome the previous lack of experience a reader has with an acronym. So, hypothesis 3 states that a reader presented with an unfamiliar but cued acronym will be more likely to recognize that word on subsequent presentations than a reader presented with a familiar but uncued acronym.

In any case, the building of and searching for lexical entries is an effortful activity that will be undertaken in

varying degrees by differing readers. An individual's tendency to engage in and derive satisfaction from effortful cognitive activity has been labeled an individual's need for cognition (Cacioppo & Petty, 1982). In order to further discriminate between readers who are successful in recognizing the meanings of acronyms and those who are not, this study will measure the degree to which a reader's possession of a need for cognition predicts the reader's ability to recognize and assign meaning to acronyms, especially unfamiliar ones. An 18-item scale developed by Cacioppo & Petty (1982, 1984) designed to measure need for cognition will be used to test hypothesis 4 which states that reader with high need for cognition presented with an acronym will be more likely to recognize that acronym than will a reader who is lower in need for cognition.

METHODOLOGY

To test these four hypotheses the independent variables are familiarity or unfamiliarity of the acronym; whether the acronym is initially cued or not; and the reader's need for cognition. The dependent variable will be recognition of the acronym.

The search for familiar acronyms began with the Associated Press Stylebook and Libel Manual. Forty-one acronyms listed in the stylebook as familiar enough to be used on first or second and subsequent reference were presented to 20 members of a graduate research methods class at the University of Florida's

College of Journalism and Communications. Four other acronyms often used in publications circulated on campus were also presented (See Appendix A for list of presented acronyms). The class members were asked to identify the acronyms. Six acronyms (CIA, EPA, FBI, GE, GM, KKK) were identified by all 20 class members. Of these six, four were chosen for use in this experiment. They are: CIA, EPA, FBI, and GE.

Four acronyms were constructed by the researcher. They contain the same number of letters as the chosen "familiar" acronyms but are not in the style book or any of several dictionaries that were referred to. These "unfamiliar" acronyms are: BLE (for Bureau of Law Enforcement), CED (for Clean Environment Department), ESD (for Economic Support Division), and PE (for Pacific Enterprise). These extremes of "familiar" and "unfamiliar" acronyms were chosen from among the continuous spectrum of familiarity that exists among acronyms so that, due to the scarcity of published research on acronyms, this experiment could serve as a foundation upon which to work in examining the central areas of the spectrum.

Cuing is conceptually defined as an attempt to prompt recall of one literal representation with another literal representation. In this experiment, cuing takes the form of initially presenting an acronym in parentheses immediately after the first use of the words for which that acronym subsequently substitutes.

Need for cognition, an individual's tendency to engage in

and derive satisfaction from effortful cognitive activity, is measured here by the results of the 18-item need-for-cognition scale devised by Cacioppo and Petty (1982).

Recognition was measured on a 24-item scale devised by the researcher to measure two dimensions of recognition--recall and meaning assignment--on 12 different items. Answers were percents and each subject's 24 percents were added and divided by 24 to get a mean correctness of recognition score.

In addition subjects were asked to rate on seven-point scales the readability, interestingness and understandability of the manipulation.

That manipulation consisted of five stories each about 250-words long presented to subjects in the form of news stories. The control story was very different from the other four stories and contained no acronyms. The other four were written by the researcher, drawing on 17 years of experience as a reporter and editor for five daily newspapers. Each of these four stories were exactly alike, except for the acronyms used and for how these acronyms were presented. One story contained the familiar acronyms cued; a second story contained the familiar acronyms uncued; a third story contained the unfamiliar acronyms cued; and a fourth contained the same unfamiliar acronyms uncued (See appendices B, C, D, E and F).

The five versions were randomly assigned to 125 students in an undergraduate class in writing for the mass media held in the Spring of 1986 in the College of Journalism and Communication at

the University of Florida. Before receiving the stories, each student was assigned a code number and completed the need-for-cognition instrument. The subjects were not told about the researcher's interest in remembering and recognizing acronyms but were asked only to read a news story. After being allowed to read for 2.5 minutes, the subjects placed their code on and returned the stories to the researcher or an assistant. The subjects were then given a test form chat prompted them to answer which, if any, of 12 acronyms (the 4 "familiar", the 4 "unfamiliar", and 4 other acronyms) had appeared in the presented story and what did the letter of the presented acronym stand for. Except for those in the control group, each respondent had read a story containing four of the 12 acronyms. Usable responses were not returned by six subjects. This produced 119 usable sets of responses.

An analysis of variance (ANOVA) procedure was run on computer using results from each test group except the control group. Significance was assigned at the .05 level. Recognition was measured by an index created to include both the recall and the meaning-assignment dimensions of recognition. To assess recall, each subject was asked which of 12 acronyms appeared in the presented story. Each correct answer was assigned 100 percent and each incorrect answer 0 percent. To assess meaning assignment, subjects were asked to translate to words the letters in only those acronyms present in the presented story. Subjects received 100 percent for total correctness, 67 percent for two of

three letters correct, 50 percent for half correct, 33 for one of three letters correct and 0 for incorrect(not translating an acronym not present in a story was considered correct and received 100 percent. This two-dimension system resulted in each subject receiving 12 scores on each dimension, or a total of 24 recognition scores. These 24 scores (each in the form of a percent) were added and divided by 24 to produce each subject's recognition index score representing the percent of correct recognitions. This percent was treated as the dependent variable with the dichotomous variables of familiarity-unfamiliarity, cued-uncued, and high and low need for cognition as the independent variables.

The significance of the F score for the main effects of familiarity, cuedness, and need for cognition was the test for hypotheses 1, 2, and 4 respectively, while the significance of interactions between familiarity and cuedness was the test for hypothesis 3.

FINDINGS

Table 1 presents the results of the analysis of variance for the main effects and the interactions of the independent variables on recognition.

Table 1
Analysis of Variance
Recognition by Familiarity, Cuing and Need for Cognition

Sources of Variation	Degrees of Freedom	F	Signif. of F
Main Effects	3	22.4	0.001
Familiarity	1	62.9	0.001
Cuing	1	0.2	0.634
Need For Cognition	1	6.4	0.014
2-Way Interactions	3	0.9	0.426
Fam., Cue	1	0.9	0.358
Fam., Need For Cognition	1	2.2	0.142
Cue, Need For Cognition	1	0.1	0.815
3-Way Interactions	1	0.2	0.633
Fam., Cue, Need For Cognition	1	0.2	0.633
Explained	1	10.0	0.001

Familiarity accounts for a significant level of variability in the recognition score. The F score for familiarity is significant ($F=62.86$, $df=1$, $P \leq .001$). The mean correctness of recognition percent for those reading familiar acronyms is 96.3 percent while the mean correctness of recognition percent for those reading unfamiliar acronyms is 85.6 percent. This lends support to hypothesis 1 that a reader presented with a familiar acronym will be more likely to recognize that familiar acronym than will a reader presented with an unfamiliar acronym.

The ANOVA results also support hypothesis 4, that a reader high in need for cognition presented with an acronym will be more

likely to recognize that acronym than will a reader who is lower in need for cognition ($F=6.35$, $df=1$, $P \leq .014$). The mean correctness of recognition percent for those low in need for cognition is 90.0 percent while those who are high in need for cognition have a 93.0 percent mean correctness of recognition percent.

But hypothesis 2, which says that a reader presented with an acronym that is cued will be more likely to recognize that acronym on subsequent presentations than will a reader when that acronym is uncued, is not supported by the ANOVA results ($F=0.23$, $df=1$, N.S.). The null hypothesis is not rejected. The mean correctness of recognition percent for those readers presented with cued acronyms is 90.8 percent and for those presented with uncued acronyms, it is 91.8 percent.

Likewise, hypothesis 3, which says that a reader presented with an unfamiliar acronym that is cued will be more likely to recognize that acronym on subsequent presentations than will a reader when an acronym is familiar but presented uncued, is not supported. An interaction between cuedness and familiarity would be necessary to produce the results hypothesized. The interaction is not significant ($F=.86$, $df=1$, N.S.). The mean correctness of recognition percent for the group presented with cued unfamiliar acronyms is 85.4 percent while the mean correctness of recognition percent for those presented with familiar uncued acronyms is 97.9 percent and the mean recognition percent for familiar cued is 95.8 percent and for unfamiliar

uncued is 85.8 percent. The null hypothesis is not rejected.

Table 2
Cell Means
Correctness of Recognition by Familiarity, Cuing, and Need For Cognition

Total Population
Grand Mean 91.3 %
(95 Subjects)

Familiarity	
Yes	No
96.8 %	85.6 %
(48 S)	(47 S)

Cues	
Yes	No
90.7 %	91.8 %
(49 S)	(46 S)

Need For Cognition	
Low	High
90.0 %	93.0 %
(54 S)	(41 S)

The four groups exposed to acronyms were compared to the control group which read another story containing no acronyms to see if the population means of correctness of recognition are significantly different. A multiple range test used the Scheffe procedure to compare each group's mean recognition percent with all the others.

The two groups exposed to known acronyms were not significantly different from one another nor from the control group on correctness of recognition while the two groups exposed to unknown acronyms were not significantly different from one another.

This again gives more support to the notion that whether the

reader knows an acronym before it is presented has great impact on whether that reader recognizes the acronym and that lack of cuing has little impact on the chances of recognition.

Post hoc analysis also found statistically significant support for the proposition that familiar acronyms help produce more readably, interesting and understandable stories.

Table 3
Analysis of Variance
Readability by Need For Cognition, Familiarity, and Cuing

Sources of Variation	F	Degrees of Freedom	Signif. of F
Main Effects	4.6	3	Ø.ØØ5
NFC	2.Ø	1	Ø.157
Familiarity	11.5	1	Ø.ØØ1
Cuing	1.2	1	Ø.28Ø
2-Way Interactions	Ø.5	3	Ø.656
NFC,Fam.	1.4	1	Ø.235
NFC.,Cuing	Ø.1	1	Ø.956
Fam., Cuing	Ø.4	1	Ø.555
3-Way Interactions	Ø.5	1	Ø.486
NFC, Fam., Cuing	Ø.5	1	Ø.486
Explained	2.3	7	Ø.Ø36

Table 4
Analysis of Variance
Interestingness by Need for Cognition, Familiarity, and Cuing

Sources of Variation	F	Degrees of Freedom	Signif. of F
Main Effects	9.5	3	Ø.ØØ1
NFC	6.7	1	Ø.Ø11
Familiarity	23.4	1	Ø.ØØ1
Cuing	Ø.1	1	Ø.7Ø3

2-Way Interactions	1.6	3	Ø.186
NFC,Fam.	2.6	1	Ø.113
NFC, Cuing	2.1	1	Ø.149
Fam., Cuing	Ø.1	1	Ø.893
3-Way Interactions	Ø.2	1	Ø.627
NFC,Fam.,Cuing	Ø.2	1	Ø.627
Explained	4.8	7	Ø.ØØ1

Table 5
Analysis of Variance
Understandability by Need for Cognition, Familiarity, and Cuing

Sources of Variation	F	Degrees of Freedom	Signif. of F
Main Effects	8.3	3	Ø.ØØ1
NFC	2.7	1	Ø.1Ø4
Familiarity	21.9	1	Ø.ØØ1
Cuing	1.8	1	Ø.182
2-Way Interactions	1.5	3	Ø.221
NFC, Fam.	3.1	1	Ø.Ø81
NFC, Cuing	Ø.4	1	Ø.66Ø
Fam., Cuing	Ø.6	1	Ø.424
3-Way Interactions	Ø.1	1	Ø.832
NFC,Fam.,Cuing	Ø.1	1	Ø.832
Explained	4.2	7	Ø.ØØ1

CONCLUSIONS

This experiment suggest that for acronyms at the extreme ends of the familiarity spectrum cuing readers to the meaning is not an important factor in whether readers will recognize those

acronyms. Rather, this study highlights the importance of reader familiarity in recognizing acronyms. Not only were correctness of recognition percent scores higher among those who read stories with familiar acronyms than those presented stories that were identical except for the substitution of unfamiliar acronyms, but post hoc analysis showed that those presented with familiar acronyms also found their stories significantly more interesting, more understandable and more readable.

In addition, of readers who said they had difficulty with the presented stories, those who were presented with unfamiliar acronyms, whether cued or uncued, had significantly lower recognition percent scores than those in the same group who were presented with known acronyms.

All of this suggests that unless an acronym is in a reader's lexicon, that reader will have difficulty recognizing it as an abbreviation for a previously mentioned entity. It is important to note that it is the reader's lexicon, not the writer's or the editor's, which is important here.

This calls into question the assumption of reader familiarity that underlies the inclusion of specific acronyms in the Associated Press Stylebook and Libel Manual. If only six of 41 such acronyms are recognized by 20 university graduate students, what will be the proportions in a more general and, presumably, less literate newspaper audience?

That audience can be segmented in many ways and this study indicates that people who enjoy thinking are better able to make

the cognitive maneuvers necessary to recognize acronyms. Again, there is a darker reverse side to that statement--that those who do not enjoy thinking are less able to recognize acronyms.

The limitations of this study point to other areas where research could be fruitful. This study deliberately focused on the extremes of the familiarity spectrum in choosing acronyms. The results indicate that cuing seems to have little effect on reader recognition of either very familiar or completely unfamiliar acronyms. It does not hint at what might be the effect of cuing on a reader presented with acronyms which are not completely unfamiliar but which are not very well known either. It may be that this condition, where the reader's lexical entry for the acronym is still being formed and the related cognitive structure is still vague or uncompleted, cuing may give the reader an extra nudge toward recognition.

And there may be effective ways to cue acronyms other than by placing them in parenthesis after the words they represent. Perhaps placing the acronym before the words it represents could be useful. Perhaps taking a complete sentence to explain to readers that the acronym will be used in later references would be effective. There are many other possibilities.

APPENDIX A

Results Of Acronym Familiarity Test

tested March 6, 1986
20 subjects

Number of Subjects Correctly Identifying	Acronym
20	CIA EPA FBI GE GM KKK
19	ERA FDA NAACP
18	GPA IBM IQ PLO
17	AMA FCC UF UFO
16	GOP YMCA YWCA
15	NATO
14 or fewer	ABM (6) ASPCA (10) AWOL (14) DOE (9) DOT (14) FAA (13) FDIC (6) HUD (13) ICBM (13) ICC (2) IRA (13) ITT (13) IUD (13) NASA (13) NLRB (8) NOW (14) NRA (13) OPEC (13) RCA (7) ROTC (7) SAC (1) SST (6)

APPENDIX B
KNOWN AND CUED ACRONYMS STORY

Three federal agencies secretly helped General Electric (GE) Co. in a failed venture that may have cost taxpayers $1 billion.

The Central Intelligence Agency (CIA) and the Federal Bureau of Investigation (FBI) Friday subpoenaed GE financial records.

In addition, the Environmental Protection Agency (EPA) is examining manufacturing records of a GE subsidiary firm in Raleigh, N.C.

Investigators are trying to determine the roles of the FBI, the CIA and the EPA in a complicated international maneuver apparently aimed at subverting secret Swiss attempts to dominate the world microcomputer market.

Federal sources said the operation cost U.S. taxpayers at least $1 billion and left the Swiss virtually assured of success in marketing a revolutionary new microcomputer.

The sources gave this account of the apparently failed federal operation:

In June 1984,GE President Carlton Swift, hearing of Swiss research success in developing microswitches, told his friend, CIA Director Malcolm J. Jones, that Swiss success could seriously damage this country's economy.

Jones, apparently without the knowledge of President Reagan, met with FBI Director Robert Daniels and Swift.

The three decided it was in the national interest to funnel millions of dollars in FBI and CIA funds to GE to set up a microchip manufacturing operation in Raleigh.

Jones and Daniels arranged for EPA waivers to build the plant. EPA administrators also pledged to uphold secrecy.

While the firm rushed into research and manufacture of advanced chips, the CIA attempted to undermine Swiss research in unspecified ways. The FBI provided the plant in Raleigh with a high level of security.

Last week, details of the federal operation started to become public after the Swiss firm, Intertel, introduced a microcomputer that it said can do what is now done by six so-called "super" computers and the Raleigh plant suddenly closed.

The EPA Thursday cited the Raleigh plant for dumping millions of gallons of untreated acids from silicon processes into the soil.

APPENDIX C
KNOWN AND UNCUED ACRONYMS STORY

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APPENDIX D
UNKNOWN AND CUED ACRONYMS STORY

Three federal agencies secretly helped Pacific Enterprise (PE) Co. in a failed venture that may have cost taxpayers $1 billion.

The Economic Support Division (ESD) and the Bureau for Law Enforcement (BLE) Friday subpoenaed PE financial records.

In addition, the Clean Environment Department (CED) is examining manufacturing records of a PE subsidiary firm in Raleigh, N. C.

Investigators are trying to determine the roles of the BLE, the ESD and the CED in a complicated international maneuver apparently aimed at subverting secret Swiss attempts to dominate the world microcomputer market.

Federal sources said the operation cost U.S. taxpayers at least $1 billion and left the Swiss virtually assured of success in marketing a revolutionary new microcomputer.

The sources gave this account of the apparently failed federal operation:

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Jones, apparently without the knowledge of President Reagan, met with BLE Director Robert Daniels and Swift.

The three decided it was in the national interest to funnel millions of dollars in BLE and ESD funds to PE to set up a microchip manufacturing operation in Raleigh.

Jones and Daniels arranged for CED waivers to build the plant. CED administrators also pledged to uphold secrecy.

While the firm rushed into research and manufacture of advanced chips, the ESD attempted to undermine Swiss research in unspecified ways.

The BLE would provide the plant in Raleigh with the highest level of security possible.

Last week, details of the federal operation started to become public after the Swiss firm, Intertel, introduced a microcomputer that it said can do what is now done by six so-called "super" computers and the Raleigh plant suddenly closed.

The CED Thursday cited the Raleigh plant for dumping millions of gallons of untreated acids from silicon processes into the soil.

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The sources gave this account of the apparently failed federal operation:

In June 1984, PE President Carlton Swift, hearing of Swiss research success in developing microswitches, told his friend, ESD Director Malcolm J. Jones, that Swiss success could seriously damage this country's economy.

Jones, apparently without the knowledge of President Reagan, met with BLE Director Robert Daniels and Swift.

The three decided it was in the national interest to funnel millions of dollars in BLE and ESD funds to PE to set up a microchip manufacturing operation in Raleigh.

Jones and Daniels arranged for CED waivers to build the plant. CED administrators also pledged to uphold secrecy.

While the firm rushed into research and manufacture of advanced chips, the ESD attempted to undermine Swiss research in unspecified ways.

The BLE would provide the plant in Raleigh with the highest level of security possible.

Last week, details of the federal operation started to become public after the Swiss firm, Intertel, introduced a microcomputer that it said can do what is now done by six so-called "super" computers and the Raleigh plant suddenly closed.

The CED Thursday cited the Raleigh plant for dumping millions of gallons of untreated acids from silicon processes into the soil.

APPENDIX F
CONTROL STORY

There are a thousand stories in the cold, naked city of Anchorage, Alaska, and most of them are about the 1,000 moose that roam the streets and hillsides in and around town.

Lee Glenn met one of them. The critter stumbled down a steep embankment onto a darkened city street in the path of Glenn's Mercedes-Benz. About 1,200 pounds of moose came sliding into the windshield.

"The force of the collision blew the rear and side windows right out of the car," recalls Glenn, a researcher with the Alaska Department of Fish and Game who suffered only cuts and bruises in the accident. The moose died, however, and the Mercedes, which cost $8,000 to repair, "has never been the same," added Glenn.

Glenn's encounter with an urban moose isn't unusual. Anchorage these days is a sprawling city of 230,000 with subdivisions, shopping centers, skyscrapers and four-lane highways, but the moose can't seem to take the hint.

Before it sprouted into a town, Anchorage sprouted hugh stands of birch and willow, making it prime winter moose range. So each year when deep snows make grazing in the surrounding hills difficult, scores of moose, undaunted by the traffic clutter and noise of civilization, come to lunch in the city, where the living seems easier.

Unfortunately, for moose and motorist alike, the trip often ends badly. State game officials estimate that 140 moose die each year in collisions with automobiles in the city's streets, 30 or more of those on a busy eight-mile stretch of the four-lane Glenn Highway within the city's northern limits.

The area has become so dangerous that the state highway department is spending $1.5 million to build the world's first "moose underpass" to funnel moose traffic under the highway.

Michael G. McDonald, a biologist with Alaska Department of Fish and Game keeps tabs on the city's moose traffic. McDonald hopes that the 10-by-20 foot passageway, combined with several miles of highway fencing, will significantly reduce the moose mayhem, which miraculously hasn't killed any motorists.

Whether the moose will use the underpass is another question. McDonald said,"I hate to say moose are dumb, but they aren't as wily as, say, an elk or a deer."

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